

30800 - General chemistry

Syllabus Information

Academic year: 2023/24

Subject: 30800 - General chemistry

Faculty / School: 105 - Facultad de Veterinaria

Degree: 568 - Degree in Food Science and Technology

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Basic Education

Module:

1. General information

The subject and its expected results respond to the following approaches and objectives:

The student who comes to study the subject of General Chemistry, in the Degree of Food Science and Technology, begins their university career and, therefore, it is essential to inculcate a model of study and approach of learning in its entirety. The scientific nature of the subject implies the approach and resolution of the problems as well as the capacity of practical application of the acquired knowledge.

In this case, it is a subject whose evaluable contents alone do not yet provide the student with direct capabilities to contribute to the achievement of the 2030 Agenda, however they are essential to base the subsequent knowledge of the rest of the degree that is more directly related to the SDGs and therefore to the Agenda 2030

2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

Is able to use appropriate scientific language, oral and written, as well as the knowledge of basic concepts of basic chemistry and organic chemistry, included and indicated in the syllabus which serve as a basis for other subjects of the degree program.

Is able to solve numerical questions related to the application of the theoretical aspects covered in the syllabus. Is able to know and handle or know and know how to use the technical and experimental means necessary to be able to come into contact with the scientific and experimental method, included in the practical work of the subject.

Is capable of imprinting on the whole learning of chemistry an idea of living, useful and necessary science and to know how to apply it wherever necessary.

Is capable of acquiring a capacity for personal interrelation both with the teacher and with other students, which teaches them to assume commitments with the system (delegations, commissions, etc.) and with the environment (work in groups, discussion of topics, work on practice scripts, tutored work, personal tutorials, etc.). This is important because these students are in their first year of university

Understands a scientific protocol of the corresponding level and is able to present and defend it publicly. Is able to perform a basic experimental work from the corresponding bibliographic references.

3. Syllabus

The program offered to students to help them achieve the expected results includes the following activities

1.- Principles of Chemistry. Fundamentals of General Chemistry.

Topic 1.- Solutions and their properties. Types of solutions. Terms used... Expression of concentrations, their interconversion. Colligative properties of solutions. Electrolytic solutions. Conductivity. Strong electrolytes.

Activity. Ionic strength.

Topic 2.- Chemical equilibrium. Principles of chemical equilibrium. Equilibrium constants. Types of equilibrium. Factors affecting balance.

Topic 3.- Acid-base equilibria. Acids, bases and salts. Equilibrium constants and calculations. Buffer solutions, characteristics, examples. Henderson-Hassel Bach equation. Resolution of related problems. Amino acids, acid-base behaviour. Relationship to pH.

Topic 4. Electrochemistry. Electrolysis and Faraday's laws. Batteries. Electrode potentials and their measurement. Normal

hydrogen electrode. Reference electrodes. Relationship between electrode potentials and concentration: Nernst equation. Problems related to the subject.

Topic 5. Complexes, definition and formation. Factors influencing the formation of complexes. Formulation of complexes. Formation constants, characteristics and most important ligands. Problems related to the subject.

Topic 6. Sample processing. Definition of the process of analysis of a sample. Objective of sample treatment, definition of concepts in the development of the analytical method. Different sample treatment processes: digestions, extractions, separations, sample treatment performance, use of blanks.

2.- Principles of Chemistry. Fundamentals of organic chemistry and formulation:

Topic 1. General principles in organic chemistry. Types of formulas. Bond formation in carbon compounds.

Types of carbon atoms. Homologous series and functional groups.

Topic 2. Formulation and nomenclature, Reactivity of organic compounds.

Topic 3. Isomerism. Definition. Different types of isomerism. Importance of stereoisomerism. Exercises related to isomerism.

3.- Practical Applications and Tutored Work, Descriptors:

Knowledge and handling of laboratory material. Basic safety and hygiene standards in the laboratory work. Audiovisual support.

Handling of the balance and pHmeter. Demonstrations of basic laboratory operations. Use of material and basic equipment.

Practice 3.- Preparation of solutions I. Solid-liquid. Expressions of concentration and interconversion. Handling of the balance.

Preparation of solutions II. Liquid-liquid. Expressions of concentration and interconversion. Handling of pipettes.

Practice 5.- Preparation of solutions III. Application of the preparation of solutions for analytical determinations.

Preparation of buffer solutions.

Preparation of regulatory mixtures. Calculation and measurement of pH and measurement of buffering capacity. Handling of the pH meter.

Resolution of exercises related to the practices carried out.

4. Academic activities

The 6 ECTS will be broken down into participatory teaching assignments, as follows:

- 40 hours of lectures or classroom classes. It is carried out with the totality of the students. In them, the contents of the theoretical program of the subject will be followed in an orderly and chronological manner.

- 5 hours of problem solving, also done in the classroom, in two subgroups with half of the students, compared to theory group. In these classes, we will solve problems whose statements and results are previously available to the student, solving those of more interest or those the student finds more difficult to solve. The work in this activity is completely participative and interactive between the teacher and the students.

- 15 hours of practical laboratory work, distributed in six 2-hour sessions and one 3-hour session. In them the student individually, performs an experimental work protocol, in its entirety, from theoretical basis, calculations, preparation of material and obtaining results. This experimental protocol is perfectly established in a practice script, which has to prepare and solve the questions prior to the realization of the practice.

- 20 hours of supervised work. It consists of the oral presentation of a paper prepared and tutored by the teacher. is carried out in groups of three students, two tutoring sessions are established prior to the presentation, each lasting approximately half an hour, and then the oral presentation is made to the rest of the students, in the practical laboratory, lasting approximately fifteen minutes.

At the beginning of the term, the student has at their disposal the teaching material useful for the work in this subject of Chemistry, both theoretical and practical problems and scripts . All this is provided by the teacher and can be found in the reprographic service of the Faculty and in the ADD (Anillo Digital Docente) of the subject.

5. Assessment system

The student must demonstrate achievement of the intended learning results through the following assessment activities:

Assessment criteria and levels of demand:

The subject is graded out of 10 points.

The passing grade is 5 points.

The final grade of the subject will be constituted by the grades provided by the different parts. The grades are the result of the sum of the grades of the different evaluable sections with the corresponding requirements. In them. it is intended to collect both the continuous work, as well as the synthesis work..

The assessment of the subject will be distributed in the following manner

THEORY (TP1), SEMINARS (TP2), INTERNSHIPS (TP3), and SUPERVISORY WORK (TP6).

The evaluable sections are as follows:

I. Attendance, use and questionnaire of practices (TP3): 2 points.

II. Preparation and presentation of the tutored work (TP6): 1 point.

III. Written exam (TP1 + TP2): 7 points

The sum of the grades of sections I, II and III is 100% of the total grade. Section I, 20% and section II, 10%. Section III will account for 70% of the total grade.

The following requirements must be met in order to be able to add up the grades and, therefore, consider the parts passed: The evaluation of section I must reach a minimum of 1 point The evaluation of section II must reach a minimum of 0.5 point The evaluation of section III must reach a minimum of 2.8 points.

The grade obtained in the tests corresponding to sections I and II, as long as they reach the required minimums, will be maintained in successive calls during the academic year and the following ones. However, as the student is entitled to repeat the practices, they may do so if they considers it of interest.

In the case of failing sections I and II, a global test will be given at the end of the term.